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## THE EFFECTS OF FOOD AESTHETICS ON CONSUMERS. VISUAL STIMULI AND FOOD MARKETING

Review

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***Abstract***

*In this study we analyze how the visual impact influences consumers, in particular considering the way a food is presented, exploring in this way how food marketing is also a question of food appearance. Do we eat firstly with our eyes? And if yes, which are the consequences of this process on food marketing strategies? Literature highlights that the way food is presented produces effects from a cerebral and a physiological point of view, but also how it affects taste. In the first part of this research literature has been explored, paying attention in particular on hunger as a process which begins from eyes and, secondly, on how neatness makes food more desirable. The second part of the study shows our experiment on consumers. Specifically 71 subjects were involved, divided into four groups, that had to observe and evaluate some plates of fruit and bresaola, once arranged neatly, once disorderly. Data have been gathered and analyzed, in particular highlighting consumers' expectation about the tastiness of the food and how much they would have spent to eat that food. Finally we discuss about the findings, in*

*particular underlining how neatness counts in the presentation. From the point of view of managerial implications, these findings may be useful to understand the role of appearance to implement a winning food marketing strategy.*

**Keywords:** *Food Marketing, Cross-modality, Visual hunger, Food aesthetics, Neatness*

## **1. INTRODUCTION**

This study is essentially focused on how the sense of sight influences the perception of food, in particular if a particular disposition can have repercussions on appetibility. Specifically a well neat position in a dish could be perceived differently compared to a messy arrangement, with consequences on customers' perceptions and, in particular, on his/her positive or negative opinion on a particular food. The concept on which this research is based is fundamentally that taste is not only a question of flavour but, more complexly, it depends on the interaction of the five senses (cross-modality). In this research paper the focus is on the interaction between taste and sight: as affirmed by van der Lann et al. (2011) food selection is firstly guided by the visual system. This is particularly evident also analyzing a cognitive neuroscience review by Spence et al. (2016) which highlights the deep effects on neural activity due to the view of food images (both on a physiological and psychological perspective).

From this point of view it is clear that food aesthetics is not a secondary element to think about but, on the contrary, represents something which could influence the consumers' choices about food. Zellner, Strickhouser and Tornow (2004) highlight, from this perspective, that liking for a food can be reduced if a particular visual cue inspires a particular taste but it is different from expectations. For this reason this study is aimed at exploring how food disposition affects consumers' taste, specifically analyzing how neatness is important in their evaluations. To this end the experimental structure of the paper is inspired by Zellner et al. (2011): our study has the goal to verify if neatness influences consumers and if the conclusions of these scholars are confirmed.

## **2. LITERATURE REVIEW**

### **2.1 The influence of appearance: colour and shape**

Consumption is not only a question of taste but it implies the interaction among the senses (Stillman, 2002). In particular the sense of sight and its impact on gustatory expectations (Spence et al., 2010, Passamonti et al., 2009) are particularly connected, as also shown by LaBar et al. (2001), who studied how food visual stimuli cause a particularly evident reaction in the brain, in particular in the amygdala and associated inferotemporal regions. Hurling and Shepherd (2003) analyzed the effect of appearance on liking, finding that the

expectations for cooked food depends essentially on the expectations of the raw product, highlighting how appearance plays an important role; Wooley and Wooley (1973) showed how salivation increases even just observing (or thinking) a palatable food, in particular when associated with the expectation to eat that food.

Food appearance has also consequences on taste expectations. One of the most attractive element is definitely colour (Spence, 2015): its impact could be so high, for example, to replace sugar in sweetness perception (Clydesdale, 1993). Wei et al. (2012), moreover, found how colour affects consumers. Their study was focused on an orange juice in particular, to better comprehend how colour influences expected and perceived sensory characteristics. These scholars found that colour affects deeply consumers' expectations, as a matter of fact:

- a greenish juice is expected to be sourer than a reddish one (similarly Fernandez-Vazquez et al., 2014, studied the effects of colours on liking of an orange juice, underlining how a greenish tone increases the perception of sourness);
- a yellowish green juice is expected to be bitterer compared to other colours;
- highly saturated yellow makes consumers expect a fresh juice.

Similarly Pangborn (1960) showed how a green pear nectar is perceived less sweet than a colorless one; also Zampini et al. (2007), through two experiments, verified the link between colour and taste expectations: in the following table their findings are summarized.

Table 1

Findings by Zampini et al. (2007)

Colours	Expected flavour
Green	Lime
Orange	Orange
Blue	Spearmint
Yellow	Lemon
Red	No particular association
Grey	No particular association

Source: Zampini et al. (2007)

Another element which can affect eaters is shape. As a matter of fact, as shown by Gal, Wheeler and Shiv (2007) shape, as well as light, influence gustatory judgements. Piqueras-Fiszman et al. (2012) analyzed the influence of colour (black and white) and shape of the plate on flavour (specifically of a strawberry mousse). In particular they found that the colour of the plate affected the participants' perception of flavour intensity (the mousse served on the white plate was perceived to be more intense in flavour intensity); on the contrary shape did not appear to represent a discriminant factor in perceiving a more intense taste. By contrast Ngo, Misra and Spence (2011) showed how a

particular shape is matched with different kind of chocolate, specifically milk chocolate (characterized by a low cocoa content) are associated with round shapes, while high cocoa content chocolate with angular ones. Similarly, another interesting study on shape and taste is that of Velasco et al. (2015). Through four experiments they demonstrated that sweetness is matched with roundness while bitterness, saltiness and soourness are associated with angular shapes. Another variable which can alter the perception of a particular gustatory sensation is the physical state, as highlighted by Alley and Alley (1998). A sample of fifty high school students were given an aqueous sucrose solution both in a liquid and in a solid form: the results showed how sweetness was perceived as higher in the case of the liquid solution. Similarly the same conclusions were found by Moskowitz et al. (1974), as a matter of fact a vanilla pudding and a yellow cake (solid food) was perceived to be less sweet than a liquid containing the same sucrose concentrations.

## 2.2 Balance of food on a plate

As showed previously, particular visual characteristics of food can play an important role in the perception of taste. The presentation of a dish is not a secondary factor, even the orientation of a plate for example can affect customers' liking and willingness to pay (Michel et al., 2015); furthermore a balanced presentation is preferred according to Velasco et al. (2016), confirming how food aesthetics plays a decisive role for eaters.

An interesting study is that of Michel et al. (2014) who studied the impact of an artistic presentation. To this end sixty participants were recruited: they were served the same ingredients presented in three different versions: the first one was inspired by the "Painting number 201" by Wassily Kandinsky, the second one was a regular presentation, the last one a neat version, in which every ingredient were arranged side by side.



Picture 1 Presentations in Michel et al.(2014) experiments

Source: Michel et al. (2014).

Fundamentally the art-inspired presentation was well-accepted by the subjects. As a matter of fact, before consuming it, they expressed their will to pay

a higher price for it, considered more artistic and complex than the other version. Not only: after the phase of consumption it has been evaluated as the tastiest, showing how a particular arrangement of food could be influential. Particularly significant is the study carried out by Zellner et al. (2011), which inspired also our experimental design. These scholars, through three experiments, showed that:

- there were no significant difference in attractiveness between the balanced and unbalanced presentation of a hummus according to participants, however the first one was considered tastier, concluding that balance has an effect on liking in the case of a complex food and not in a simpler one;
- there were no significant difference in attractiveness between the neat and messy presentation according to participants, however the neat version was considered tastier, concluding that neatness is the real factor which influence liking of a plate, and not balance (because also the balanced messy version was evaluated less tasty);
- a neat presentation is expected to be tastier than the messy one, and participants would pay more for it; moreover they thought it came from a high quality restaurant and more care has been given for its preparation.

In another study Zellner et al. (2014) compared two different plates, both judged neat in the presentation but different in attractiveness: the more attractive version was deemed to be tastier (this was true for all the plates except for string beans).

### 3. EXPERIMENTAL DESIGN

This study aims to analyze what people perceive and expect when watching a plate of food, rather two: one totally plant-based and the other with some animal origin elements. Each plate is presented in two versions: in the first one there is an ordered and nice disposition of the elements while in the second one the same elements are disposed messily.

There have been 71 participants. Unlike the previous experiment organized by Zellner et al. (2011):

- real plates – specifically prepared for the analysis – have been placed in front of the participants. In the previous experiment, the participants thought that they would have liked the food of the ordered plate more than the messy one. However this was in contradiction with the effective evaluations of the first two phases of the experiment, when the participants tasted the food and judged it consequently: first of all because expectations are often different from the reality; secondly – the participants judged according to the pictures they saw rather than to the real food, which might have influenced their evaluations;
- each participant examined a single plate and not all the 4 proposals; this is because if one observes and judges an object and then he/she must

judge another one with the same elements but in different disposition, he/she inevitably will judge considering the previous evaluations. This behavior is typical of human beings trying to be coherent with what made previously. In this study we have chosen to eliminate this variable in order to achieve an authentic objectivity in evaluation.

Considering these conditions, we wanted to analyze the different judges of the participants based on the different perceived degrees of contamination and attention - that according to them were involved in the preparation of the food - and on the taste prediction.

### 3.1. Methodology

#### Materials

We have prepared two dishes:

1. a plate with a slice of pineapple, a half kiwi, a slice of melon and one strawberry, decorated with a leaf of the pineapple lock and with a line of cacao to maintain the equilibrium;
2. a plate with four slices of Bresaola, a diced-cut tomato, a slice of fresh tomato, a slice of mozzarella and some basil.

These elements were served into ceramic plane plates of 26 cm diameter; the different presentations are the following ones:



Picture 2 The plates

*Source: Photos by authors*

It is important to underline the fact that the experiment has been made gradually: participants of the first cluster have judged at first the neat fruit plate,

then we messed the same elements in the same plate and so other participants (grouped together in the 2nd cluster) have judged the messy plate until the fixed quorum has been reached. The same modus operandi has been used for the Bresaola plate. In this way variables like “difference in elements cut”, “difference in the amount of elements in the two presentations”, “difference in colour or in the shape of the elements of the plate” have been totally eliminated.

### Participants

There have been 71 “citizens of the world” involved in the analysis. We have chosen a public location, where there are even many tourists – involved in the analysis too. These participants have contributed to the experiment in turn. Once the quorum for each presentation – of almost 15 evaluations - has been reached, the compiled forms have given rise to a definite cluster. Naturally at the end of the experiment we got four groups of evaluations:

1. The group of those who observed and judged the ordered fruit plate: “FruOrd”;
2. The group of those who observed and judged the messed fruit plate: “FruDis”;
3. The group of those who observed and judged the ordered Bresaola plate: “BreOrd”
4. The group of those who observed and judged the messy Bresaola plate: “BreDis”.

### Place

The whole analysis took place in a 9 sm. place, which is situated next to the cathedral of Altamura (Apulia, Italy) and consequently to its relative public square. The part of the experiment, which involved the public took place in 20/21 of April 2016, days immediately preceding the event “Federicus” - a medieval party which has an international echo and attracts many tourists.



Picture 3 The place

*Source: Photos by authors*

## Procedures

We have personally chosen the passer-by, one by one. Once the attention was captured, we asked to the selected person if he/she had 30 seconds to dedicate to us in order to participate to a research experiment, which consisted in watching a plate of food and, according to the individual perceptions, assigning 5 scores as an answer to simple questions. If the person accepted, the last filter-question was: “do you suffer from any kind of allergy?”. None of the participant involved suffered from any kind of allergy.

Each participant entered this room in which there were:

- A table with a light beige tablecloth (neutral background)
- Plate of food well enlightened by a L.E.D desk lamp
- A pen and a paper with questions to assign
- A sealed cardboard box
- A pack of Lindt chocolates.



Picture 4 How participants could evaluate the plates

*Source: Photos by authors*

The participants were asked to answer sincerely, since the questionnaire was anonymous and the figures would have been treated on an aggregated basis. In particular they were asked to give a specific value to five questions, which were:

- 1) How much do you think you would like the food on this plate? Give a value from -100 (dislike extremely) to +100 (like extremely);
- 2) “How much money would you be willing to pay for this plate of food?”  
Give a value in euros;
- 3) How much care do you think the preparer took with the plate of food?  
Give a value from 0 (no care) to +10 (a lot of care);
- 4) What do you think is the quality of the restaurant in which the food was prepared? Give a value from 0 (very low) to +10 (very high);
- 5) From 0% to 100%, what is the percent chance that this plate of food has been contaminated?

After having expressed their own opinion, each participant has mailed the paper in the box and has been invited to take a Lindt chocolate as token of thanks. The results for the four groups, FruOrd, FruDis, BreOrd, BreDis are illustrated in the following schedules. In the top line there is the number of participants for every group, in the first column the reference to the five questions, indicated above.

Table 2

FruOrd cluster, 17 participants (9 m, 8 f) from 17 to 63 years old

Subjects	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Questions																	
1	80	80	50	/	40	/	50	100	96	100	75	90	50	80	100	70	70
2	10	5	1,50	5	6	7	4	5	5	5	5	4	4	5	6	5	5
3	8	9	7	7	9	8	6	8	10	5	3	10	5	7	8	8	9
4	7	10	6	7	8	10	7	10	9	7	4	6	2	7	10	8,5	9
5	15	4	50	50	10	8	6	6	85	30	1	100	3	50	1	5	80

Source: Elaboration by authors

Table 3

FruDis cluster, 17 participants (8 m, 9 f) from 20 to 65 years old

Subjects	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Questions																	
1	50	/	-5	90	10	90	100	62	6	50	-50	80	60	-30	50	20	30
2	6	4	2	4	0,50	3	2	5	5	2	2,50	3	2	3	0,5	3	2,50
3	5	3	1	6	1	5	6	7	6	7	3	4	7	1,5	3	3	5
4	8	5	2	7	4	8	8	3	6	5	10	5	6	5	5	4	6
5	100	50	90	70	50	100	40	90	70	80	80	20	50	100	20	70	90

Source: Elaboration by authors

Table 4

BreOrd cluster, 19 participants (10 m, 9 f) from 20 to 65 years old

Subjects	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Questions																			
1	90	70	30	90	100	90	100	90	100	100	60	50	100	50	80	80	100	80	80
2	9	7	3	4	8	8	10	8	10	8	35	5,50	10	7	10	10	15	5	7
3	10	8	6	8	10	10	10	7	9	10	9	8	8	9	10	10	8	10	8
4	5	8	6	7	6	10	8	9	8	10	9	9	10	10	10	9	10	6	6
5	70	50	1	0	40	2	1	40	3	0	40	50	0	80	8	0	70	40	0

Source: Elaboration by authors

Table 5

BreDis cluster, 18 participants (10 m, 8 f) from 21 to 58 years old

Subj.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ques																		
1	80	0	100	50	60	50	-80	-50	40	80	80	80	30	5	-20	97	50	-50
2	10	3	15	3	2	7	10	5	6	5	8	8	8	1	5	7	5	5
3	8	5	7	5	3	2	7	4	5	6	8	5	2	0	3	6	8	1
4	8	5	6	6	6	6	7	6	5	9	9	5	2	2	3	5	7	1
5	0	3	50	20	70	5	60	50	6	90	40	90	100	80	90	50	80	0

Source: Elaboration by authors

## 4. DISCUSSION

Comparing the schedules 1 and 2, there is no doubt that the neat fruit plate has made sure that the expectation of pleasure was in general higher for the group FruOrd than the group FruDis.

The same thing happened making reference to the price they would be willing to pay: it is easy to mark that the price the participants of the group FruOrd were willing to pay was higher than that of the group FruDis. Even with the arithmetic average, in the first case we obtain a value of 5,14 €, while in the second one we arrive at 3,94 €.

Data concerning the third question make realize that if there is care, it is perceived – we need only look at the scores – and probably, as stated in the previous studies, it has a positive effect on the other factors which have been analysed until now.

Moreover, even the quality of the place in which the food is eaten becomes suddenly higher in the case of a neat plate rather than a messy one; we can state this making reference to the answers of the participants to the question 4. The scores, apart from some unusual value, are generally higher for the group FruOrd.

Only the results concerning the probability of contamination are generally higher for the group FruDis, in witness to the fact that a messy plate creates pejorative information about the general evaluation of whom observes it.

Going on, from the comparison of the schedules 3 and 4 we can observe that the trends are the same: a higher perceived taste, a higher price that one is willing to pay, higher perceived care and higher perceived quality of the place where the plate has been prepared, for the group BreOrd; on the contrary, the perception of contamination has resulted higher for the group BreDis.

As regards the differences between the two plates (the fruit and the Bresaola ones), we cannot have reliable results, considering the small number of people that formed the groups. Even if the percentage of the perception of contamination of the messy versions is double – for both plates – we have not marked in this case a higher perception of contamination for the messy Bresaola plate compared to the messy fruit plate, unlike it happened in the previous experiment. According to us, this might be due to the same factor that we preferred to eliminate in our experiment, that is the fact that each participant should have observed and evaluated all the proposals. The lack of a strong baseline (in the case of the previous experiment, due to the same evaluation on the other versions) made sure that there was no point of departure to express personal opinion on the complex theme of contamination.

## 5. CONCLUSIONS

At this point, it is simple to draw our conclusions: it is true that “we eat with our eyes”. “Neatness is relevant”, even this is true. The participants did not know each other, they did not talk with each other about the experiment, they did not observe the other version of the plate; they had in common only the same

measure or the same range of values for their evaluations. Considering now ordinary life, all this can help both consumers – too often our judgment of taste is influenced by external elements – and marketing specialists. In this perspective, we can state that the marketing actions of food could use pictures as a powerful leverage to attract consumers, on one hand (as they actually do), and care about the product so that the consumer is satisfied even after the consumption, on the other hand. If we achieved only the first effect without caring about the second one, our strategy would be ineffective (typical of flimflam man), whereas a good strategy plan should accompany the experience of pleasure of the product in question from the birth of the need until its complete satisfaction. If, on the contrary, we care about only the final product without considering the building of a corporate identity and the charm of a product which is able to attract consumers at a simple glance and to make them appreciate the values and the vision of the company, our marketing action would lack of this fundamental element through which the consumers – or better the persons – can identify themselves as the best addressees of the proposed product and consequently start the process of purchasing.

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